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THE CULTURE GIVEN BY SCIENCE.

To be a man of broadest culture is a high ideal. Fortunately, the idea and the associations conveyed by this word 'culture' are still of the finest, the noblest. But when scanned in the new light of the present, has not the flower of culture, like everything else of the best, gained a living heart of science, taken on the pure, high, unfading colors of science, the benign empress of our modern world? And with this change has not culture developed a firmer moral fiber from the inexorable, inevitable insistence of science on a moral courage in her votaries which would sacrifice all unflinchingly in the pure cult of truth?

Before the age of science the man of the then culture was, as his fellows, in fear of being known to have been wrong.

Said Lowell: "There are three short and simple words, the hardest of all to pronounce in any language (and I suspect they were no easier before the confusion of tongues), but which no man or nation that cannot utter can claim to have arrived at manhood. These words are, *I was wrong*."

Even Goethe, the very highest type of culture not based on a core of science, even Goethe, with his calm and coldness as of the immortals, with his magnificent appetite and digestion, even Goethe mouths and sulks and rants like a stupidly obstinate boy when even his friends declare that in the explanation of colors he is wrong and the man of science, Newton, is right. He snarls and spits to the very last, and, like his countryman, Hegel, makes himself disgusting by blaspheming Newton.

Says J. H. Stirling, Hegel's devoted apologist: "One thing, however, he will not think excusable even in a Hegel: this letter's unsparing bitterness of tone to him—Newton—whom as a productive thinker mankind have so much reason sincerely to thank and supremely to honor."

Says Helmholtz: "To give some idea of

the passionate way in which Goethe, usually so temperate and even courtier-like, attacks Newton, I quote from a few pages of the controversial part of his work the following expressions, which he applies to the propositions of this consummate thinker in physical and astronomical science—"incredibly impudent;" "mere twaddle;" "ludicrous explanation;" "but I see nothing will do but lying, and plenty of it."

Nothing could more exactly illustrate the change of heart which culture has undergone. Could any one imagine Justus von Liebig berating Pasteur for overthrowing utterly Liebig's theory of fermentation?

The friends of Darwin bemoaned the inestimably valuable time which he habitually gave to considering the weakest objections of the feeblest objectors, and even to setting forth and clothing all objections with his own strength.

The culture given by science is strikingly characterized by equipoise of mind, impartiality of view, freedom from obscurations due to selfishness, a taking of self objectively.

This comes in part from the fact that high scientific instruction or attainment cannot be divorced from scientific investigation.

Thus, in Germany, the leader of modern culture, "a university professor is both a teacher and a scientific investigator, and the latter is considered the more important." "Again, when a professor is mentioned the question is asked: What has he written? What are his scientific achievements?"

The culture given by science relegates to the moribund institutions of tradition the old hypothesis that truth is given and fixed, and needs only to be transmitted unchanged. We have seen in our own generation changes accepted and made part of regular university instruction which are so deep-reaching as to under-cut the knowledge thought fixed for twenty centuries. Witness the non-Euclidean geometry and evo-

lution. The watchword of modern scientific culture is independence of thought and investigation, "Whatsoever is, may be wrong!" Its most cherished palladium is freedom to think, freedom of research, freedom in teaching.

To break a bond restricting liberty to search and say the truth may be more important than killing a definite positive error. The culture given by science can tolerate no distinct dogmatic brand.

A pertinent illustration is found in the attitude of the highest culture now toward language and language teaching. It is found that language, like the expression of numbers by symbols, has attained a higher state by taking aid from space concepts, by making definitely fixed use of position as significant.

The inflectional languages, such as Latin and Greek, correspond to their writing of numbers. There is a hint at some use of position. Witness IV. and VI., or the difference of emphasis given by position in the Latin sentence. But this is like confining the use of steam to the blowing of whistles. Compare 10 and .01, or a few English sentences with their Latin translations. Like the Hindoo discovery of the zero and consequent modern arithmetic is the organic use of position in language as typified by English.

Again, the number system of every child is at first *one, two, many*. The third number, the indefinite, takes different forms, 'some,' 'a few,' 'a lot,' etc. But the mental step from knowing *two* up to knowing *three*, recognizing a class or aggregate as just exactly possessing the distinctive quality *three*, as being triple or a triplet, is a slow and long and difficult step. In the high-bred, smart American child this step represents roughly a whole year's development, which cannot be much hastened.

Now, just this child stage, with the enormously undue importance which it attaches

to the number two, is represented by the whole Greek language and grammar. This speech has a whole system of grammatical forms, called duals, whose creation rests wholly on the baby mistake, the child misconception of *two*. To babies and to Greek grammar *two* is still a god in a trinity.

A modern writer speaks slightly of 'the aping and prolonged caw called grammar, the cackling of the human hen over the egg of language,' but may not the laborious puerilities which have so long passed current as Latin and Greek grammar be of interest to the scientist in comparative child study? "A single scientific idea may germinate into a hundred arts."

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#### CONVENTION OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

THE American Society of Mechanical Engineers held its annual spring convention at St. Louis recently, discussed a number of valuable papers, visited many points of interest and enjoyed informal meetings for social purposes. The papers were less numerous than usual and included fewer very striking or novel communications than ordinarily.\* The convention was fairly well attended and very greatly enjoyed by all who took part.

The Secretary of the Society, Prof. Hutton, presented a discussion of the catalogue system proposed for engineering libraries. Dewey's 'Decimal Classification' was considered a model difficult to excel for general purposes. For an engineering collection, however, further classification is required, and the writer of the paper proposed a special scheme including twenty-two heads, each covering a division of engineering science or art. To these were appended about

\* The papers will appear in the Transactions of the A. S. M. E., Vol. XVII., 1896.